

NORTON SOUND SUMMER RED KING CRAB FISHERY 2001

By

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ABSTRACT

The legal male crab abundance for the 2001 Norton Sound summer commercial crab fishery was estimated at 3.8 million pounds. A guideline harvest level (GHL) of 303,000 pounds of crab was set for the 2001 summer season. The Norton Sound CDQ crab allocation is 7.5% of the GHL. Therefore, 22,725 pounds of crab was reserved for the CDQ fishery and 280,000 pounds was the target goal for the open access fishery. The 2001 summer open access, king crab fishery opened by regulation 12 noon, July 1 and closed by Emergency Order 12 noon, September 1, 2001. The total commercial catch was 11,928 crab or 288,199 pounds. Thirty vessels and 37 permit holders took part in the 2001 fishery. Two buyers operated in Norton Sound during the season. Local boats accounted for 66 percent of the total crab harvest. Overall CPUE was 7.6 crab per pot. The average price for crab was \$2.34 per pound and the fishery value was estimated at \$674,385. Recruit crab made up 33 percent of the legal crab sampled, an almost 10 percent decrease in recruitment since 1999. The CDQ portion of the fishery was open September 2 and closed September 9, 2001, but there was no crab harvest. The 2001 Norton Sound crab fishery had the highest number of participating vessels and permit holders since 1996. A shift in the fishery effort and harvest eastward and closer to shore since 1993 is caused in part by the change in character of the fishery to that of a small vessel fishery.

INTRODUCTION

The Norton Sound Section consists of all waters in Statistical Area Q north of the latitude of Cape Romanzof, east of 168° west longitude, and south of the latitude of Cape Prince of Wales (Figure 1). A large vessel summer commercial red king crab fishery existed in the Norton Sound Section from 1977 through 1992. No summer commercial fishery occurred in 1991. A budget cut the previous winter prevented necessary staffing needed to manage the fishery. In 1992 the large vessel summer commercial fishery resumed. Regulation changes adopted during the March 1993 Board of Fisheries meeting changed the character of the fishing fleet to that of a small boat fleet. A superexclusive designation went into effect for the Norton Sound commercial crab fishery June 27, 1994. This designation stated that a vessel registered for the Norton Sound crab fishery may not be used to take king crab in any other registration area during that registration year. A vessel moratorium put into place before the 1996 season had the intention of creating a license limitation program. The North Pacific License Limitation Program (LLP) went into effect for the Norton Sound crab fishery January 1, 2000. The program states that a vessel which exceeds 32 feet in length overall must hold a valid crab license issued under the LLP by the National Marine Fisheries Service.

During the March 1999 meeting of the Board of Fish, a new management strategy was put into place for the Norton Sound summer red king crab fishery (5AAC 34.915). The threshold level of abundance of legal male red king crab biomass was set at 1.5 million pounds. This means the summer commercial season may only open if the population of legal crab exceeds 1.5 million pounds. If the legal biomass falls to a range of 1.5 to 2.5 million pounds the harvest rate will not exceed five percent, so that the stock may rebuild. If the legal biomass is 2.5 million pounds or more, the harvest rate will be no more than ten percent. Improved abundance estimates and the current management strategy will greatly reduce the risks of overfishing the stock.

Estimates of the legal red king crab biomass in Norton Sound, based on eight trawl surveys conducted between 1976 and 1999, have been standardized; accounting for design and coverage (Appendix 1). The Norton Sound legal red king crab biomass in 1976 was estimated to be roughly 8.1 million pounds. By 1982, the legal biomass had fallen to 2.6 million pounds because of a lack of recruitment and high harvest rates in the summer commercial fishery. The population then gradually recovered to an estimated 4.0 million pounds of legal crab in 1991. The trawl survey conducted during August of 1996 indicated a reduced stock size and estimated the legal biomass at 1.6 million pounds. The surveys taken as a whole indicate there have been periods of weak and strong recruitment.

The 1999 Norton Sound trawl survey estimated an all-time high prerecruit-1 male abundance (sublegal male crab with carapace length 90-104 mm). This estimate indicated that the legal component continued to expand at least for the 2000 fishery. In 1999, the legal red king crab population was estimated to be near the historical high biomass level (Appendix 1). The population level had nearly tripled since 1996. Conversely, the exceptionally weak 1999 prerecruit-2 (sublegal male crab with carapace length 76-89

mm) abundance estimate suggested at least one year of weaker recruitment beginning during the 2001 summer fishery. The combination of the trawl survey conducted during the summer of 1999 and the winter study of 2000 resulted in an estimate of 4.2 million pounds of legal crab for the 2000 summer fishery. These high numbers were the result of strong recruitment over the previous three years. The estimated legal male crab abundance for the 2001 summer commercial crab fishery was estimated at 3.8 million pounds. An 8 percent exploitation rate equated to a guideline harvest level (GHL) of 303,000 pounds of crab. This satisfied the harvest strategy set by the Board of Fish and also took into consideration the lower recruitment rate anticipated for the 2001 season. The Norton Sound CDQ crab allocation is 7.5% of the GHL. Therefore, 22,725 pounds of crab reserved for the CDQ fishery and 280,000 pounds would be the target goal for the open access fishery. The legal male biomass is now within the range staff believes will produce the highest sustainable yields. Current size composition data indicates, that the portion of crab population classified as large old shell males is somewhat depressed, but is expected to increase in number somewhat in the next few years. Large old-shell males are responsible for most reproduction within the male population. It will be important to maintain this segment of the population to provide for continued recruitment.

HARVEST SUMMARY

Open Access Fishery

The 2001 summer open access commercial crab fishery was opened by regulation on 12 noon, July 1 in the Norton Sound Section. Two companies were registered to buy crab in Norton Sound during the 2001 season. One of these buyers operated a floating processor and purchased crab from local Norton Sound fishers. An independent observer was placed onboard the floating processor. Nonlocal fishers delivered to the second buyer who flew live crab to markets in Dutch Harbor and Anchorage. Fishers also sold their catch dockside as catcher/sellers. The open access portion of the fishery was closed by emergency order 12 noon, September 1, 2001 when the harvest was expected to approach the goal of 280,000 pounds. The closure was done to enable the Norton Sound CDQ allocation to be harvested.

The total harvest from fish ticket reports was 98,321 red king crab or 288,199 lbs (Table 1). Of this total, 6,384 pounds were reported as deadloss and 3,645 pounds were reported as personal use. A total of 30 vessels made deliveries and 37 permit holders fished. Twenty of the vessels were considered local, ten were non-local. A total of 320 landings were made. Local boats accounted for 66 percent of the total crab harvest. The average weight for commercially caught crab was 2.9 pounds. A total of 1,200 pots were registered and there were 11,928 pot pulls throughout the fishery. The average price paid was \$2.34 per pound. The exvessel value of the fishery is estimated at \$674,385.

Fish ticket reports document that nine statistical areas were fished (Table 2). Stat areas 636401 and 626401 had the highest catch with 91,343 and 61,620 pounds of crab

respectively. The other large catches came from stat areas 656401 (55,158 pounds), 666401 (43,771 pounds) and 656330 (20,869 pounds). The catch from stat areas south of Golovin Bay (626401, 636330, and 636401) made up 54 percent of the harvest. All other stat areas comprised 46 percent of the harvest. Overall, catch per unit effort (CPUE) was 7.6 crab per pot.

The first delivery was made on July 3. The final delivery was made September 13, 2001. Although the open access fishery ended 12 noon, September 1, some fishers had been holding storage pots off shore and had to wait for weather and available airplanes to make deliveries. The commercial crab fleet concentrated in two areas of operations throughout most of the open access fishery. Part of the fleet delivered to the floating processor anchored in Golovin Bay. The other portion of the fleet based their operations out of the Port of Nome. These fishers sold crab locally or to a processor flying live crab to markets in Anchorage and Dutch Harbor. The floating processor ceased operations in Norton Sound on August 17. The floating processor was the primary market for local fishers. When it left the grounds, these fishers had to find their own markets and coordinate transportation of live crab to Nome. Many fishers relocated their efforts toward Nome, or pulled their gear and stopped commercial fishing. This slow down was seen in the lower harvest numbers after August 17. Fishers reported double shell and molting crab in the harvest beginning the third week of August.

CDQ Fishery

The Norton Sound red king crab open access summer season ended September 1 with an estimated harvest of 286,871 pounds. This number was calculated from verbal reports from fishers (final fish ticket reports indicated 288,199 lbs. were actually harvested). By regulation, the CDQ fishery is allocated 7.5% of the combined summer season harvest. Therefore, the CDQ harvest quota was set at 23,260 pounds. The Norton Sound and Lower Yukon CDQ groups divided this allocation. The CDQ fishery was opened by emergency order at 12 noon, September 2, 2001 and closed 12 noon, September 9, 2001. Only fishers designated by the Norton Sound and Lower Yukon CDQ groups are allowed to participate in this portion of the king crab fishery. Fishers must have a CDQ fishing permit from Commercial Fisheries Entry Commission (CFEC) and register their vessel with ADF&G before they make their first delivery. Fishers operate under the authority of the CDQ group. The individual CDQ groups decide how the CDQ crab quota will be harvested.

Because this fishery occurred in September, the department had concerns that molting would make the crab unmarketable and increase mortality rates of crab returned to the water. The crab molt had begun during the last 2 weeks of August. The incidence of molting crab would only continue to increase during the month of September. The timing of the CDQ fishery optimized the harvest of quality crab while they still had good shell condition. Fishers that participated in the open access fishery and who intended to take part in the CDQ fishery were allowed to leave their pot gear in the water with doors open and bait containers removed until the CDQ fishery began.

No harvest was reported from the CDQ fishery. Fishers had deployed pots, or had left gear in the water from the open access fishery. Most fishers had not received their CDQ permits by the opening of the CDQ fishery. This delayed fishers from making deliveries when weather was good. A request to extend the fishery was made by one of the CDQ groups on September 4. The department decided not to extend the fishery because of the biological concern of molting crab. Weather was good to fair until September 7, but no deliveries were made. Requests were made to extend the fishery because of poor weather and ocean conditions on September 8. The department chose to remain with the closing date of September 9 because of the continuing biological concern for molting crab.

Harvest Sampling

Carapace length measurements and shell age were collected from 20,030 crab during the open access portion of the fishery. Carapace age was classified as new (2-12 months old) or old (over 13 months old) (Table 3, Figure 2). Recruit crab are new shell legal crab with carapace length < 116 mm. Postrecruit crab are legal new shell male crab with carapace length \geq 116 mm and all legal old shell males. Recruit crab made up 33 percent of the legal crab sampled and postrecruit crab made up 66 percent (Table 3, Figure 3). Male crab with new shell carapaces made up 90 percent of the total legal crab sampled, and old shell crab made up 10 percent. Overall mean carapace length of legal male crab was 119.3 mm (Table 3).

DISCUSSION

The 2001 Norton Sound crab fishery had the highest number of participating vessels and permit holders since 1996 (Appendix 2). The GHL set above 300,000 pounds of crab, also caused an increase in participation in the 2000 fishery. From 1997 through 1999, the GHL for the summer commercial crab fisheries was set at 80,000 pounds (Appendix 3). This level was set after the 1996 trawl survey showed a reduced stock size. Participation dropped significantly during these three years because fishing became economically impracticable for fishers and buyers.

There has been a shift in the fishery effort and harvest eastward and closer to shore since 1993 (Figure 4, Appendix 4). This is caused in part by the change in character of the fishery to that of a small vessel fishery. Before 1993, most vessels participating in the Norton Sound summer king crab fishery were 100 foot or greater in length and had circulating holding tanks. These vessels could deploy hundreds of pots and the fishery usually lasted a few days. These larger vessels with tanks also had to stay away from fresh water influences that would kill crab in holding tanks. Since 1993, most of the vessels participating in the summer crab season are 32-foot modified herring and salmon skiffs with no circulating tanks. These boats are ill equipped to handle heavy seas, and

fishers prefer to fish closer to shore in case bad weather occurs. Near shore fishing has brought about the focus of the commercial crab fleet toward stat areas offshore of Golovin Bay. The closed water boundary line is close to land and boats have a short distance to run if weather deteriorates.

Average CPUE was down from 17.7 crab per pot in 2000 to 7.6 crab per pot in 2001. More vessels took part in the fishery during the 2001 season, and there were several fishers with little or no commercial crab fishing history. Fishers in the Golovin area were also setting gear in close proximity to each other. At one point in the fishery, 18 vessels were fishing in the same area offshore of Golovin. Fishers stated throughout the season that they were not able to locate large quantities of crab as easily as they had during the 2000 season. The floating processor remained anchored in Golovin Bay for most of the fishery, requiring some vessels had to run longer distances to check pots and deliver to the floater. Therefore, fishers were reluctant to move gear and locate the movements of the crab migration.

The Norton Sound summer commercial crab harvest has shown an almost 10 percent decrease in recruitment since 1999 (Appendix 5). This decrease was expected, as the 1999 trawl survey pointed to an all-time high prerecruit-1 male crab population, and indicated an exceptionally weak prerecruit-2 abundance (Appendix 1). The decrease would also suggest another year of lower recruitment during the 2002 summer fishery. The triennial trawl surveys give us the best indication of recruitment for future years. The next trawl survey for Norton Sound king crab is scheduled for August 2002.

The average legal mean length of male crab during the 2001 fishery showed a 3 mm increase since the 2000 fishery. An increasing trend in average legal mean length is likely for the 2002 season. The larger populations of recruit crab observed in 1999 and 2000 will molt and become the larger postrecruit crab portion of the population.

The Norton Sound red king crab fishery has had the benefit of an onboard observer on a floating processor for the 2000 and 2001 seasons. Previously, 1993 was the last year that Norton Sound had a floating processor on the fishing grounds. In years when there is no onboard observer, a smaller percentage of crab from the commercial harvest get sampled because fishers deliver at all times of the day and night. Norton Sound Economic Development Corporation is building a seafood processing plant in Nome to begin operations in the summer of 2002. Processing crab will be one of the main functions for this plant. It is unclear if a floating processor will be in operation for the 2002 season. The department will have to make a concerted effort to coordinate catch sampling with fishers and buyers to ensure optimal harvest data collection.

Table 1. Daily catch (using fish ticket data) for the open access summer commercial king crab harvest
Norton Sound Section, Eastern Bering Sea, July 1 - September 1, 2001.a

Date	Landings	Number of Crab	Lbs of Crab Harvested	Cumulative Total (lbs)	No. of Pots Pulled	Average Weight (lbs)	CPUE
7/1/2001							
7/2/2001							
7/3/2001	1	229	600	600	28	2.6	8.2
7/4/2001	2	980	2,995	3,595	80	3.1	12.3
7/5/2001	1	240	745	4,340	20	3.1	12.0
7/6/2001	1	300	920	5,260	40	3.1	7.5
7/7/2001	11	2,847	8,281	13,541	360	2.9	7.9
7/8/2001	5	2,121	6,059	19,600	130	2.9	16.3
7/9/2001	3	1,199	3,454	23,054	104	2.9	11.5
7/10/2001	6	2,358	6,798	29,852	223	2.9	10.6
7/11/2001	10	3,413	9,817	39,669	401	2.9	8.5
7/12/2001	6	2,544	7,201	46,870	224	2.8	11.4
7/13/2001	4	2,345	5,036	51,906	240	2.1	9.8
7/14/2001	9	2,921	8,367	60,273	342	2.9	8.5
7/15/2001	8	1,946	5,758	66,031	257	3.0	7.6
7/16/2001	2	70	220	66,251	15	3.1	4.7
7/17/2001	1	17	50	66,301	38	2.9	0.4
7/18/2001	12	4,507	13,059	79,360	437	2.9	10.3
7/19/2001	7	2,657	7,842	87,202	336	3.0	7.9
7/20/2001	8	2,004	5,801	93,003	341	2.9	5.9
7/21/2001	7	1,634	4,744	97,747	259	2.9	6.3
7/22/2001	10	1,914	5,484	103,231	330	2.9	5.8
7/23/2001	7	1,244	3,555	106,786	256	2.9	4.9
7/24/2001	2	267	745	107,531	65	2.8	4.1
7/25/2001	11	2,781	7,988	115,519	389	2.9	7.1
7/26/2001	5	1,359	3,892	119,411	172	2.9	7.9
7/27/2001	9	1,674	4,823	124,234	279	2.9	6.0
7/28/2001	4	652	1,956	126,190	116	3.0	5.6
7/29/2001	11	3,201	9,350	135,540	444	2.9	7.2
7/30/2001	4	679	2,086	137,626	98	3.1	6.9
7/31/2001	19	12,140	36,277	173,903	1698	3.0	7.1
8/1/2001	2	289	853	174,756	38	3.0	7.6
8/2/2001	5	691	2,016	176,772	126	2.9	5.5
8/3/2001	1	108	322	177,094	28	3.0	3.9
8/4/2001	3	589	1,670	178,764	100	2.8	5.9
8/5/2001	11	3,057	9,469	188,233	304	3.1	10.1
8/6/2001	3	463	1,379	189,612	80	3.0	5.8
8/7/2001	1	444	1,333	190,945	40	3.0	11.1
8/8/2001	8	2,269	6,790	197,735	245	3.0	9.3
8/9/2001				197,735			

-continued-

Table 1. Page 2 of 2

8/10/2001	11	3,253	9,950	207,685	392	3.1	8.3
8/11/2001	6	1,800	5,832	213,517	211	3.2	8.5
8/12/2001				213,517			
8/13/2001	5	796	2,378	215,895	155	3.0	5.1
8/14/2001	9	1,591	4,798	220,693	248	3.0	6.4
8/15/2001	5	955	2,686	223,379	142	2.8	6.7
8/16/2001	7	2,154	6,048	229,427	243	2.8	8.9
8/17/2001	9	7,682	23,016	252,443	470	3.0	16.3
8/18/2001	1	72	204	252,647	10	2.8	7.2
8/19/2001	3	1,035	3,509	256,156	140	3.4	7.4
8/20/2001	1	300	900	257,056	25	3.0	12.0
8/21/2001	2	570	1,710	258,766	69	3.0	8.3
8/22/2001	3	670	2,010	260,776	90	3.0	7.4
8/23/2001	1	50	150	260,926	20	3.0	2.5
8/24/2001	5	965	2,778	263,704	94	2.9	10.3
8/25/2001	3	619	1,909	265,613	94	3.1	6.6
8/26/2001	3	229	668	266,281	51	2.9	4.5
8/27/2001				266,281			
8/28/2001	6	2,348	6,401	272,682	231	2.7	10.2
8/29/2001	1	151	448	273,130	40	3.0	3.8
8/30/2001	5	2,256	7,482	280,612	233	3.3	9.7
8/31/2001	5	939	2,592	283,204	142	2.8	6.6
9/1/2001				283,204			
9/2/2001	1	370	1,110	284,314	30	3.0	12.3
9/3/2001	3	1,193	3,425	287,739	105	2.9	11.4
9/4/2001				287,739			
9/5/2001				287,739			
9/6/2001				287,739			
9/7/2001				287,739			
9/8/2001				287,739			
9/9/2001				287,739			
9/10/2001				287,739			
9/11/2001				287,739			
9/12/2001				287,739			
9/13/2001	1	170	460	288,199	10	2.7	17.0
Totals		98,321		288,199	11,928	2.9	8.2

^a Open access season ended 9/1, but deliveries were made until 9/13.

Table 2. Red king crab summer commercial harvest (from fish ticket reports) by statistical area for Norton Sound Section, Eastern Bering Sea, July 1 - September 1, 2001.

Statistical Area	Number	Pounds	Pots Pulled	CPUE	Average Weight (Lbs.)	Percent of Pots Pulled in Stat. Area (%)	Percent Harvest in Stat. Area (%)
626401	21,554	61,620	2,767	7.8	2.86	23.2	21.4
636330	804	2,253	113	7.1	2.80	0.9	0.8
636401	31,590	91,343	3,698	8.5	2.89	31.0	31.7
646330	623	1,868	80	7.8	3.00	0.7	0.6
646401	1,485	4,287	244	6.1	2.89	2.0	1.5
656330	7,297	20,869	731	10.0	2.86	6.1	7.2
656401	17,870	55,158	2,100	8.5	3.09	17.6	19.1
666330	2,443	7,030	312	7.8	2.88	2.6	2.4
666401	14,655	43,771	1,883	7.8	2.99	15.8	15.2
Total	98,321	288,199	11,928	8.2	2.9		

Golovin Bay areas=	155,216	53.9
other stat areas	132,983	46.1

Table 3. Length frequencies by shell age of all legal male red king crab captured in the 2001 Norton Sound summer commercial fishery.

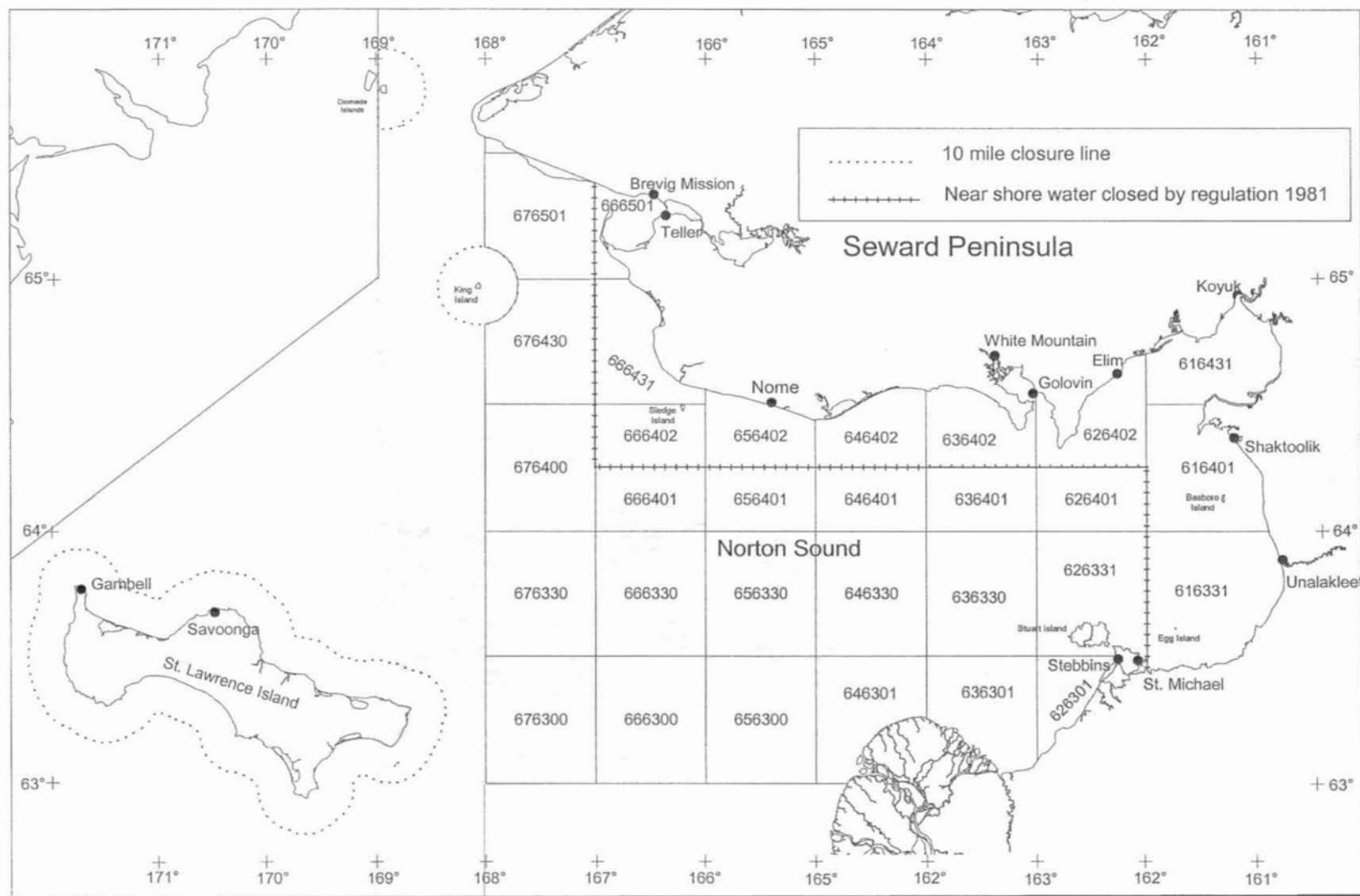
Carapace Length (mm)	<u>Legal New Shell Males</u>		<u>Legal Old Shell Males</u>		<u>Total Legal Males</u>	
	Number	Percent	Number	Percent	Number	Percent
95	1	0.0%	0	0.0%	1	0.0%
96	0	0.0%	0	0.0%	0	0.0%
97	5	0.0%	1	0.0%	6	0.0%
98	23	0.1%	0	0.0%	23	0.1%
99	21	0.1%	1	0.0%	22	0.1%
100	64	0.3%	2	0.0%	66	0.3%
101	63	0.3%	2	0.0%	65	0.3%
102	149	0.7%	3	0.0%	152	0.8%
103	161	0.8%	8	0.0%	169	0.8%
104	248	1.2%	14	0.1%	262	1.3%
105	313	1.6%	28	0.1%	341	1.7%
106	252	1.3%	27	0.1%	279	1.4%
107	391	2.0%	25	0.1%	416	2.1%
108	543	2.7%	52	0.3%	595	3.0%
109	387	1.9%	28	0.1%	415	2.1%
110	637	3.2%	78	0.4%	715	3.6%
111	353	1.8%	53	0.3%	406	2.0%
112	722	3.6%	97	0.5%	819	4.1%
113	626	3.1%	81	0.4%	707	3.5%
114	812	4.1%	134	0.7%	946	4.7%
115	900	4.5%	125	0.6%	1025	5.1%
116	516	2.6%	65	0.3%	581	2.9%
117	993	5.0%	127	0.6%	1120	5.6%
118	911	4.5%	121	0.6%	1032	5.2%
119	513	2.6%	66	0.3%	579	2.9%
120	768	3.8%	112	0.6%	880	4.4%
121	515	2.6%	60	0.3%	575	2.9%
122	737	3.7%	96	0.5%	833	4.2%
123	729	3.6%	90	0.4%	819	4.1%
124	640	3.2%	78	0.4%	718	3.6%
125	603	3.0%	72	0.4%	675	3.4%
126	369	1.8%	40	0.2%	409	2.0%
127	550	2.7%	68	0.3%	618	3.1%
128	488	2.4%	53	0.3%	541	2.7%
129	293	1.5%	30	0.1%	323	1.6%
130	401	2.0%	43	0.2%	444	2.2%
131	226	1.1%	16	0.1%	242	1.2%
132	358	1.8%	51	0.3%	409	2.0%
133	188	0.9%	25	0.1%	213	1.1%
134	300	1.5%	30	0.1%	330	1.6%
135	259	1.3%	19	0.1%	278	1.4%
136	117	0.6%	8	0.0%	125	0.6%
137	199	1.0%	19	0.1%	218	1.1%
138	141	0.7%	6	0.0%	147	0.7%
139	72	0.4%	8	0.0%	80	0.4%
140	96	0.5%	12	0.1%	108	0.5%
141	36	0.2%	1	0.0%	37	0.2%
142	61	0.3%	9	0.0%	70	0.3%
143	49	0.2%	3	0.0%	52	0.3%
144	29	0.1%	5	0.0%	34	0.2%
145	31	0.2%	4	0.0%	35	0.2%
146	14	0.1%	1	0.0%	15	0.1%
147	17	0.1%	3	0.0%	20	0.1%
148	14	0.1%	0	0.0%	14	0.1%

-continued-

Table 3. Page 2 of 2

Carapace Length (mm)	Legal New Shell Males		Legal Old Shell Males		Total Legal Males	
	Number	Percent	Number	Percent	Number	Percent
149	1	0.0%	0	0.0%	1	0.0%
150	3	0.0%	0	0.0%	3	0.0%
151	4	0.0%	4	0.0%	8	0.0%
152	2	0.0%	1	0.0%	3	0.0%
153	3	0.0%	0	0.0%	3	0.0%
154	1	0.0%	0	0.0%	1	0.0%
155	2	0.0%	1	0.0%	3	0.0%
156	1	0.0%	0	0.0%	1	0.0%
157	2	0.0%	0	0.0%	2	0.0%
158	1	0.0%	0	0.0%	1	0.0%
159	0	0.0%	0	0.0%	0	0.0%
160	0	0.0%	0	0.0%	0	0.0%
161	0	0.0%	0	0.0%	0	0.0%
162	0	0.0%	0	0.0%	0	0.0%
Totals	17,924	89.5%	2,115	10.6%	20,030	100.0%
Average Lengths	119.3		119.0		119.3	
Total Recruits=			6,671	33.3%		
Total Postrecruits			13,368	66.7%		

Figure 1. Norton Sound Section of Area Q and associated Statistical Areas



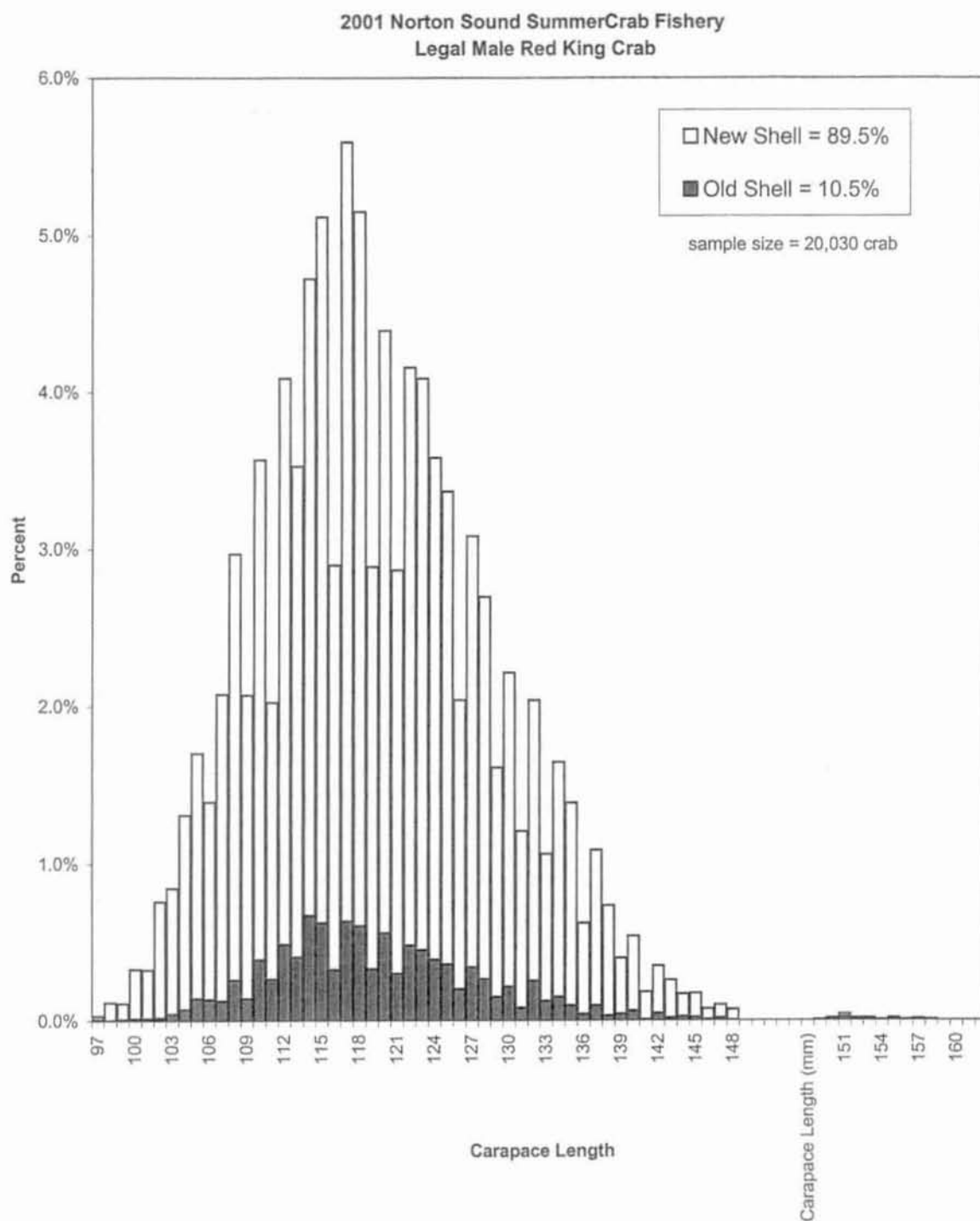


Figure 2. Length frequency distribution of new and old carapace age condition legal male red king crab, sampled from the Norton Sound summer commercial king crab fishery, July 1 - September 1, 2001.

2001 Norton Sound Summer Crab Fishery
Recruit vs. Postrecruit

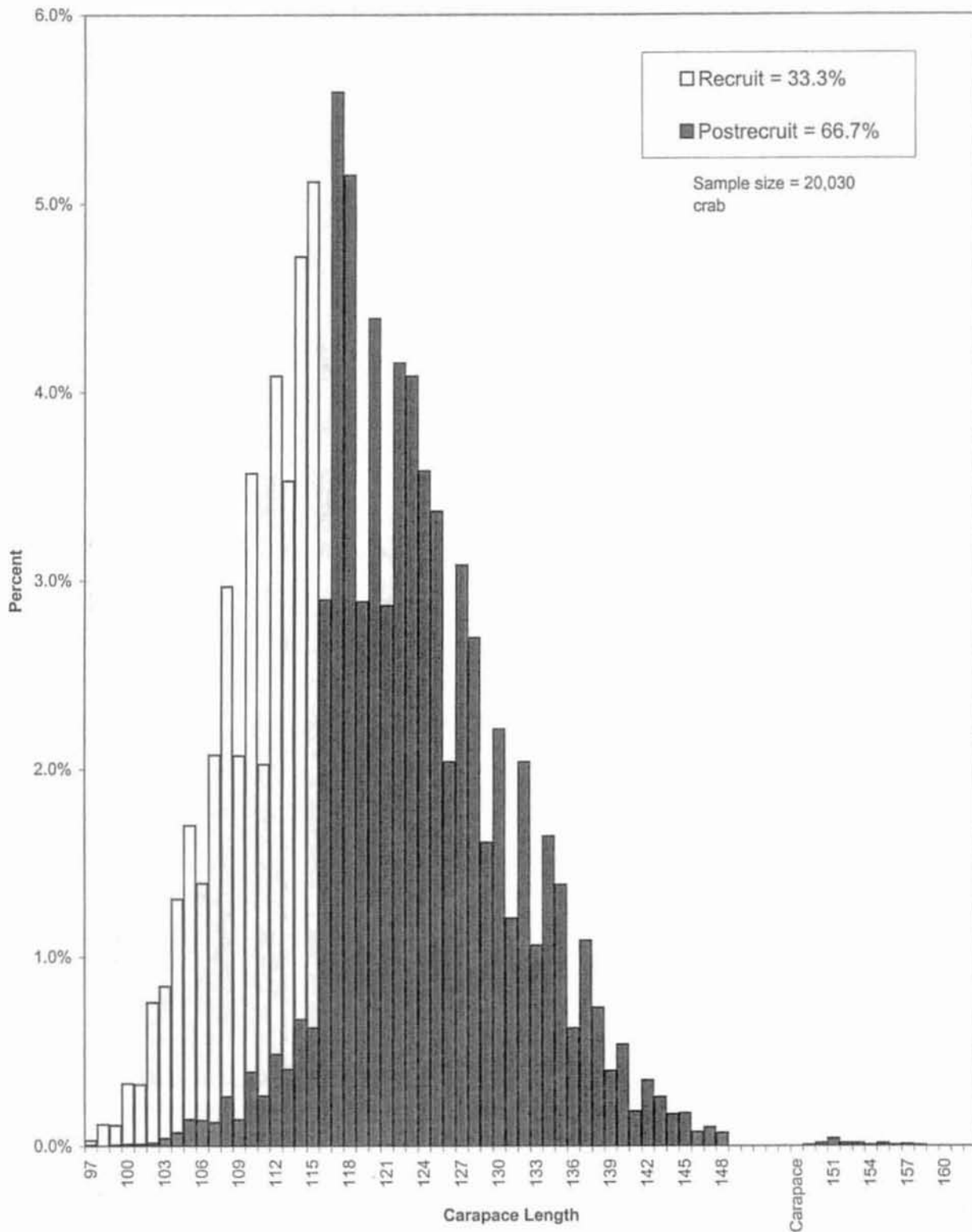


Figure 3. Carapace length measurement summary of sampled legal male king crab captured during the commercial king crab harvest, July 1 - September 1, 2001.

Percent of Crab Harvest East of 164 Degrees W

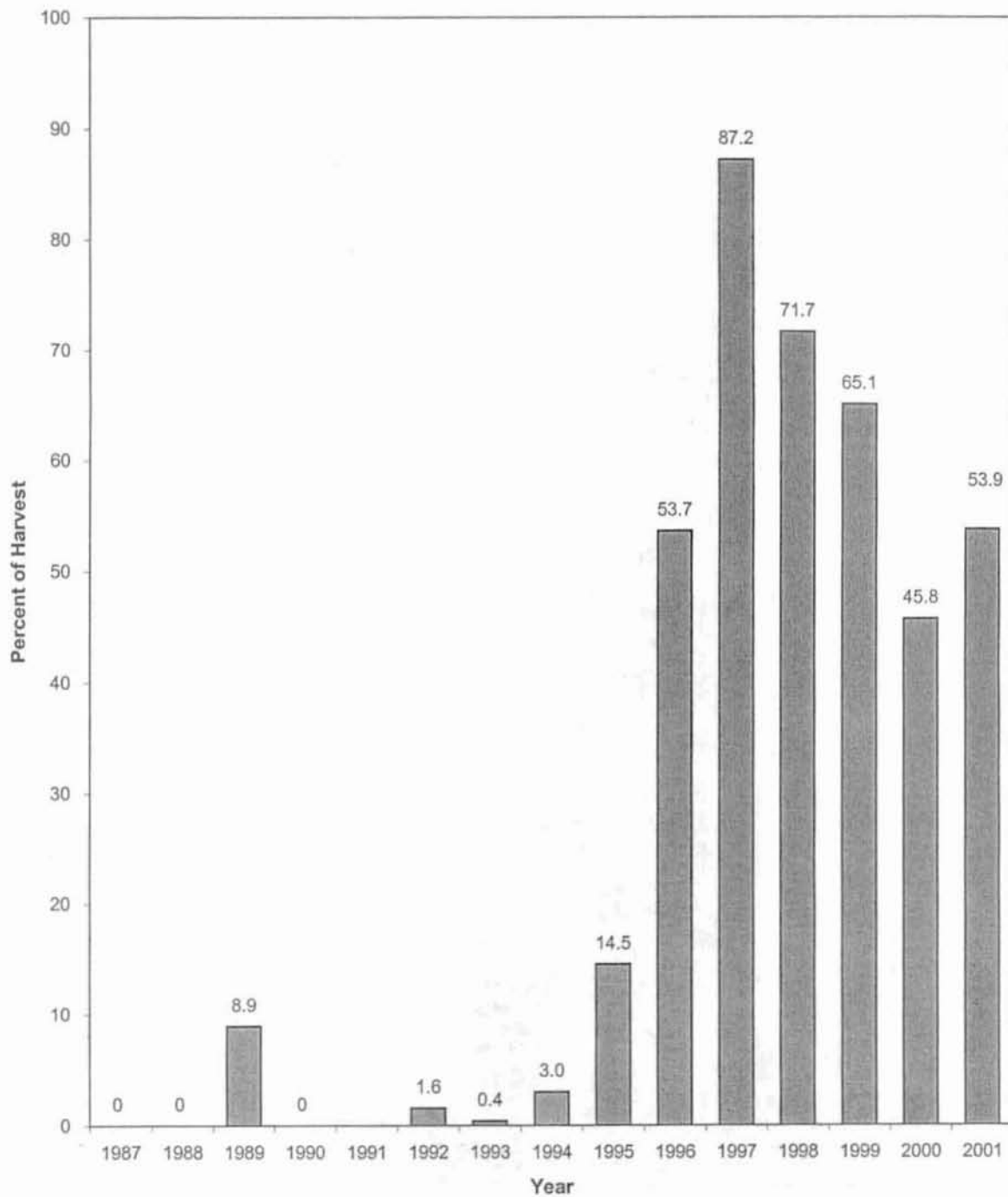


Figure 4. The percent of crab harvested during the Norton Sound summer commercial red king crab fishery east of the 164 degrees west longitude, 1987 - 2001.

Appendix 1. The results of the population assessment surveys conducted for red king crab in Norton Sound since 1976.

Population Abundance Estimates						
Year	Date	Research Agency	Gear	(Number of crab) ^c		
				Pre-2 Males ^b	Pre-1 Males ^b	Legal Males ^a
1976	9/2 - 9/5, 9/16 - 10/7	NMFS	Trawl	331,555	808,091	1,742,755
1979 ^e	7/26 - 8/5	NMFS	Trawl			809,799
1980 ^d	7/4 - 7/14	ADF&G	Pots			1,900,000
1981	6/28 - 7/14	ADF&G	Pots			1,285,195
1982	7/6 - 7/20	ADF&G	Pots			353,273
141982	9/5 - 9/11	NMFS	Trawl	356,724	832,581	877,722
1985	7/1 - 7/14	ADF&G	Pots			907,579
1985	9/16 - 10/1	NMFS	Trawl	466,858	707,140	1,051,857
1988	8/16 - 8/30	NMFS	Trawl	565,255	493,030	978,748
1991	8/22 - 8/30	NMFS	Trawl	294,801	303,682	1,287,486
1996	9/7 - 9/18	ADF&G	Trawl	452,580	325,699	536,235
1999	7/28 - 8/7	ADF&G	Trawl	103,832	940,198	1,594,341

^a Legal male red king crab were defined as at least 105 mm in carapace length for the 1996 ADF&G trawl survey and all NMFS trawl surveys except the 1979 survey which defined legal males as at least 100 mm in carapace length. ADF&G pot surveys defined legal males as at least 121 mm in carapace width.

^b Pre-2 males were defined as 76-89 mm in carapace length and pre-1 males were defined as 90-104 mm in carapace length.

^c Population estimates are valid for the date of the survey (i.e., either before or after the summer commercial fishery).

^d The 1980 pot survey estimate has been revised from the original estimate of 13.4 million pounds which was thought inaccurate due to an under-reporting of recovered tagged crab.

^e Pre-2 male and pre-1 male data is unavailable for the 1979 NMFS trawl survey.

Appendix 2. Historical summer commercial red king crab annual harvest, Norton Sound Section, Eastern Bering Sea, 1977 - 2001.

Year	Number of Vessels	Number of Permits	Number of Landings	Number of Crab	Harvest (lbs) ^a		Number of Pot Lifts	CPUE	Percent Old Shell	Average Weight (lbs)	Avg. Legal Mean Length (mm)
					Open Access	CDQ ^c					
1977	7	7	13	195,877	517,787		5,457	36	^d	2.7	113.4
1978	8	8	54	660,829	2,091,961		10,817	64	^d	3.0	118.9
1979	34	34	76	970,962	2,931,672		34,773	28	^d	3.0	119.8
1980	9	9	50	329,778	1,186,596		11,199	29	^d	3.6	125.8
1981	36	36	108	376,313	1,379,014		33,745	11	^d	3.7	128.5
1982	11	11	33	63,949	228,921		11,230	6	^d	3.6	125.4
1983	23	23	26	132,205	368,032		11,195	12	^d	2.8	115.2
1984	8	8	21	139,759	387,427		9,706	14	^d	2.8	112.5
1985	6	6	72	146,669	427,011		13,209	11	^d	2.9	115.8
1986	3	3	^d	162,438	479,463		4,284	38	^d	2.9	115.9
1987	9	9	^d	103,338	327,121		10,258	10	13	3.2	121.7
1988	2	2	^d	76,148	236,688		2,350	32	26	3.1	119.0
1989	10	10	^d	79,116	246,487		5,149	15	29	3.1	119.8
1990	4	4	^d	59,132	192,831		3,172	19	17	3.1	121.1
1991 ^b											
1992	27	27	^d	24,902	74,029		5,746	4	29	3.0	119.7
1993	14	20	208	115,913	335,790		7,063	16	10	2.9	119.1
1994	34	52	407	108,824	327,858		11,729	9	71	3.0	118.8
1995	48	81	665	105,967	322,676		18,782	5.6	21	3.0	118.2
1996	41	50	264	74,752	224,231		10,453	7.1	36	3.0	117.1
1997	13	15	100	32,606	92,988		2,982	10.9	14	2.8	115.7
1998	8	11	50	10,661	29,684		1,639	6.5	39	2.8	116.9
1999	10	9	53	8,734	23,553		1,630	5.4	12	2.7	118.1
2000	14	17	202	108,249	297,654	14,870	6,345	17.7	16	2.7	116.0
2001	30	37	320	98,321	288,199	0	11,928	7.6	11	2.9	119.1

^a Deadloss included in total.

^b No summer commercial fishery.

^c No CDQ fishery prior to the 2000 season.

Appendix 3. Historical summer commercial red king crab fishery economic performance, Norton Sound Section, Eastern Bering Sea, 1977 - 2001.

Year	Guidline	Legal Male	Commercial		Number of			Number of Pots		Exvessel	Fishery Value	Season Length	
	Harvest	Pop. Est.(lbs) ^b	Harvest (lbs) ^{a,b}		Vessels	Permits	Landings	Registered	Pulls	Price/lb	(millions \$)	Days	Dates
	Level (lbs) ^b		Open Access	CDQ									
1977	^d	10.0	0.52		7	7	13	^d	5,457	0.75	0.229	60	^d
1978	3.00	11.0	2.09		8	8	54	^d	10,817	0.95	1.897	60	6/7-8/15
1979	3.00	5.4	2.93		34	34	76	^d	34,773	0.75	1.878	16	7/15-7/31
1980	1.00	6.6	1.19		9	9	50	^d	11,199	0.75	0.890	16	7/15-7/31
1981	2.50	4.7	1.38		36	36	108	^d	33,745	0.85	1.172	38	7/15-8/22
1982	0.50	1.3	0.23		11	11	33	^d	11,230	2.00	0.405	23	8/9-9/1
1983	0.30	2.1	0.37		23	23	26	3,583	11,195	1.50	0.537	3.8	8/1-8/5
1984	0.40	2.7	0.39		8	8	21	1,245	9,706	1.02	0.395	13.6	8/1-8/15
1985	0.45	2.4	0.43		6	6	72	1,116	13,209	1.00	0.427	21.7	8/1-8/23
1986	0.42	2.8	0.48		3	3	^d	578	4,284	1.25	0.600	13	8/1-8/25 ^e
1987	0.40	2.2	0.33		9	9	^d	1,430	10,258	1.50	0.491	11	8/1-8/12
1988	0.20	3.2	0.24		2	2	^d	360	2,350	^d	^d	9.9	8/1-8/11
1989	0.20	3.2	0.25		10	10	^d	2,555	5,149	3.00	0.739	3	8/1-8/4
1990	0.20	3.2	0.19		4	4	^d	1,388	3,172	^d	^d	4	8/1-8/5
1991 ^e	0.34	3.4											
1992	0.34	3.4	0.07		27	27	^d	2,635	5,746	1.75	0.130	2	8/1-8/3
1993	0.34	3.4	0.33		14	20	208	560	7,063	1.28	0.430	52	7/1-8/28 ^f
1994	0.34	3.4	0.32		34	52	407	1,360	11,729	2.02	0.646	31	7/1-7/31
1995	0.34	3.4	0.32		48	81	665	1,900	18,782	2.87	0.926	67	7/1-9/5
1996	0.34	3.4	0.22		41	50	264	1,640	10,453	2.29	0.519	57	7/1-9/3 ^g
1997	0.08	1.6	0.09		13	15	100	520	2,982	1.98	0.184	44	7/1-8/13 ^h
1998	0.08	1.6	0.03		8	11	50	360	1,639	1.47	0.041	65	7/1-9/3 ⁱ
1999	0.08	1.6	0.02		10	9	53	360	1,630	3.08	0.073	66	7/1-9/4 ^j
2000	0.33	4.2	0.29	0.01	14	17	202	560	6,345	2.29	0.715	91	7/1- 9/29 ^k
2001	0.30	3.8	0.28	0.00	30	37	320	1,200	11,928	2.31	0.674	97	7/1 - 9/9 ^l

^a Deadloss included in total.

^b Millions of pounds.

^c No summer commercial fishery.

^d Information not available.

^e Fishing actually began 8/12.

^f Fishing actually began 7/8.

^g Fishing began 7/9 due to fishermen's strike.

^h First delivery was made 7/10.

ⁱ First delivery was made 7/16.

^j The season was extended 24 hours due to bad weather.

^k Open access fishery closed 8/29/00. CDQ fishery ran from 9/1/00 - 9/29/01

^l Open access fishery closed 9/1/01. CDQ fishery ran from 9/1/01 - 9/9/01

Appendix 4. Historical commercial harvest of red king crab from Norton Sound Section, Eastern Bering Sea, by statistical areas, 1977-2001 (catch in pounds).

Statistical												
Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
616331	7,893											
616401												
626331	40,020					22						
626401	31,572			4,830	399							
626402	38,995											
636330												
636401				12,398	61,823	32,246	5,880	41	891			
636402												
646301												
646330					4,716							
646401			155,972		1,319	17,532						
646402	80,969					748						
656300			161,699		15,174							
656330			323,518	72,735	395,662	3,983	24,246	83,479	7,632		79,006	36,129
656401			138,011	121,147	253,387	60,480	11,422	183,119	246,200		194,408	165,644
656402	306,302	90,187	288,869	918	3,098	2,832			132,363			
666230		55,490			77							
666300		162,795	60,816	84,874	9,167	95		4,534				
666330		353,016	505,050	367,446	141,513	8,990	1,192		389	70,615	2,963	13,020
666401		179,212	486,947	205,400	381,510	79,580	325,045	116,254	5,341	408,848	50,744	21,895
666402	12,036	515,778	534,938	183,581		17,585			32,992			
666431			146,029									
676300		13,238		126,231								
676330		51,304	81,798	6,762	18,734							
676400		667,130	33,856	274	92,026	1,315	247		32			
676430		3,811	12,309		373	3,513			1,171			
676501					36							
686330			1,860									
Totals	517,787	2,091,961	2,931,672	1,186,596	1,379,014	228,921	368,032	387,427	427,011	479,463	327,121	236,688

Appendix Table 4. (continued) ^a

Statistical		1989	1990	1992	1993	1994	1995	1996 ^b	1997	1998	1999	2000	2001	Totals
Area														
61	616331					48					633	4,557		13,131
	616401						35							35
	626331							61						40,103
	626401						18,971	45,045	18,066	8,065	508	4,689	61,620	193,765
	626402													38,995
	636330							4,560	3,838	2,449			2,253	13,100
	636401	22,030		1,159	1,373	8,087	24,329	70,677	59,206	10,771	14,201	126,994	91,343	543,449
	636402					1,754	3,466							5,220
	646301						4,628	13,888						18,516
	646330	5,212					1,493	2,894	314		3,021		1,868	19,518
	646401				1,963	37,222	105,045	22,834	1,052	3,194	221		4,287	350,641
	646402				730	143,511	66,821							292,779
	656300													176,873
	656330	1,757		4,814	265		19,745	15,446	4,661	4,078	1,300		20,869	1,099,325
	656401	100,956	171	53,119	105,341	29,566	32,289	9,985	4,035	1,127	2,739	94,813	55,158	1,863,117
	656402				193,079	106,053	44,000							1,167,701
	666230													55,567
	666300							25,519						347,800
	666330	1,275	27,185	4,305	31,758		730					5,839	7,030	1,542,316
	666401	115,257	162,263	10,632	746	396		3,001	1,816		930	60,762	43,771	2,660,350
	666402				535	1,221								1,298,666
	666431						1,124							147,153
	676300							546						140,015
	676330													158,598
	676400		3,212					9,775						807,867
	676430													21,177
	676501													36
	686330													1,860
Totals		246,487	192,831	74,029	335,790	327,858	322,676	224,231	92,988	29,684	23,553	297,654	288,199	13,017,673

^a No commercial fishery occurred in 1991.^b Does not include approximately 2,490 lbs not reported on fish tickets.

Appendix 5. A comparison of the proportion of recruit and postrecruit king crab sampled from summer commercial harvest, Norton Sound Section, Eastern Bering Sea, 1983 - 2001.

Year	Summer Commercial	
	Recruits (%)	Postrecruits (%)
1983	55	45
1984	59	41
1985	45	55
1986	48	52
1987	22	78
1988	25	75
1989	23	77
1990	21	79
1991 ^a		
1992	28	72
1993	31	69
1994	14	86
1995	36	64
1996	30	70
1997	49	51
1998	32	68
1999	42	58
2000	41	60
2001	33	67

^a No data collected in summer 1991 due to closed fishery.